Good for Your Health

Shellfish Safety

The National Shellfish Sanitation Program was established in 1925 after outbreaks of typhoid fever in several cities were linked to consumption of polluted shellfish. Shellfish, including oysters, clams and mussels, are filter feeders. If the water they live in is polluted, they can concentrate harmful bacteria and viruses in their tissue. The N.C. Shellfish Sanitation Program follows the guidelines of this national program and ensures the safety of shellfish consumers by monitoring harvesting waters and ensuring the proper handling of shellfish sold to the public.

In order to improve the identification of pollution sources that could affect the water quality of shellfish-growing areas, the Division of Environmental Health's Shellfish Sanitation and Recreational Water Quality Section obtained a grant from the Environmental Protection Agency in 2002 to develop new methodology for shoreline surveys. Shoreline survey staff walk the entire shoreline and look for existing and potential pollution sources. Prior to this grant, they would document these pollution sources on maps by hand with written narratives. The new methodology incorporated geographic information systems (GIS) and global positioning system (GPS) mapping technology. Using this technology, staff members could identify and map potential pollution sources such as stormwater outfalls, marinas, docks, agriculture operations and subdivisions.

The 2002 grant focused on four pilot shellfish-growing areas. In 2006, the General Assembly provided funding for the expansion of the program that would allow the mapping of all shellfish-growing areas along the North Carolina coast. "Now other local, state and federal agencies can view all of the pollution sources spatially mapped as well as have the ability to access images of the pollution source and its respective data," said Shannon Jenkins, environmental senior specialist in the Shellfish Sanitation and Recreational Water Quality Section. "The possibilities are endless as to how this information can and will benefit public health and the environmental future of North Carolina."

Jonathan Andre inspects a stormwater discharge during a shoreline survey. N.C. Division of Environmental Health.

The Department of Environment and Natural Resources does not just strive to protect the health of the environment. Its staff and programs also work hard to protect the health of North Carolina's citizens.

Bill Russ, N.C. Tourism.

Beach Advisories

Initiatives pursued by the Division of Environmental Health's Recreational Water Quality Program in 2004 and 2005 have made it easier for beachgoers to know the health status of the water before they dive in. In 2004, rules were passed that gave the program the authority to post signs on the beach at discharging storm drains. Rain washing off of roads, roofs and lawns can carry pollutants. When this polluted runoff travels down storm drains and is released through stormwater pipes on the beach, the pollutants can pose a health hazard to swimmers.

In 2005, beachgoers were able to find out about the water quality around North Carolina beaches before even getting to the beach. That is when the Recreational Water Quality Program unveiled its Web site that included current and previous sampling results and swimming advisories, sampling locations, educational materials and information on state regulations. Recreational beach quality at that time was tested at 241 monitoring stations. The Web site was updated daily to provide the most up-to-date information possible. "This new resource gives North Carolinians the ability to understand the quality of the recreational waters they visit each year," said J.D. Potts, manager of the Recreational Water Quality Program. "Water quality in North Carolina's coastal recreational waters is generally very good, and now people can see this for themselves."

Can It

In July 2007, Castleberry Foods recalled products nationwide due to possible botulism contamination. The recall involved more than 90 food products and 27 brands. In all, more than 35,000 cans of food had to be removed from grocery store shelves to protect public health. The Division of Environmental Health worked with the Department of Agriculture and Consumer Services and all local health departments to locate and detain products. Their work was recognized as the most aggressive effort in the nation.

Far Afield

Wind and ocean currents can make pollution in one part of the world an issue for another community across the globe. Many of the issues and environmental decisions we make can have global impacts. The Department of Environment and Natural Resources does not limit work to North Carolina, or even to the United States. Some of its programs and people work to protect the environment in other parts of the world.

UNITE

The N.C. Zoological Park's UNITE program, which stands for Uganda and North Carolina International Teaching for the Environment, is a unique conservation education program. The purpose of the UNITE program is to bring together teachers from North Carolina and Uganda to explore environmental issues, develop teaching skills and techniques and create hands-on lessons for students in both regions.

The first group of zoo staff and teachers from North Carolina traveled to Uganda in 2002. It was the job of this small, initial group to meet with Ugandan community groups, conservation researchers and schools. The group also assessed the educational needs of the community, looked for ways they could integrate the Ugandan and American curricular materials and determine the technological feasibility of what they wanted to do.

The following year, a slightly larger group of teachers and zoo staff made the trip, this time to conduct a conservation education workshop with 20 Ugandan teachers. The group shared curriculum ideas, teaching methods and their concerns regarding environmental, social, cultural and economic issues. Students of the North Carolina teachers were able to follow along on their teacher's adventures through daily journals that were posted online.

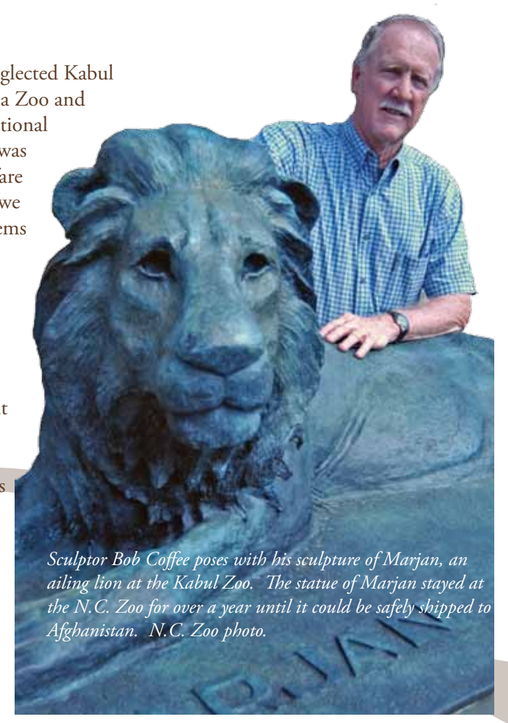
A UNITE teacher works with students at Bagodi Primary School in Uganda. N.C. Zoo photo.

The UNITE program has sent North Carolina teachers to Uganda every year since the program began. The Ugandan teachers expand their skills by learning cutting-edge, inquiry-based teaching methods to which they have never been exposed. The North Carolina teachers get to see the tropical ecosystems they teach about up close and personal. Student from both countries make personal connections with each other through letters. According to Randy Fulk, curator of education, "It truly makes thinking globally come alive."

The Kabul Zoo

The United States war in Afghanistan exacerbated the struggles of the already neglected Kabul Zoo. In 2001, the Association of Zoos and Aquariums asked the North Carolina Zoo and its nonprofit support organization, the N.C. Zoological Society, to spearhead national efforts to help the troubled facility. Dr. David Jones, director of the N.C. Zoo, was serving as chairman of the board of the Brooke Hospital, the largest animal welfare organization in Pakistan. "Because of the work we do in Pakistan," said Jones, "we have a network of people who can assist in getting funds, food and veterinary items to the Kabul Zoo."

More than $400,000 was raised to aid in this effort. Dr. Jones reported in 2005 that, although much still needed to be done, funds from the Zoo Society had improved every resident animal's enclosure. The enclosures had been enlarged and exhibit appearances had been improved. In addition, structures had been added to exhibits of those animals most in need of enrichment items. "As urgent as the need is for humanitarian aid, there is also the need to help animals that have been suffering during these times," Jones commented when the aid effort began. "As members of the international zoological community, we feel that this is where our expertise and efforts are best spent at this time."



Sculptor Bob Coffee poses with his sculpture of Marjan, an ailing lion at the Kabul Zoo. The statue of Marjan stayed at the N.C. Zoo for over a year until it could be safely shipped to Afghanistan. N.C. Zoo photo.

Iraqi veterinarian Farah Murrani trained with the vet staff at the N.C. Zoo. N.C. Zoo photo.

The Baghdad Zoo

After being called on to help the Kabul Zoo in 2001, The Association of Zoos and Aquariums asked N.C. Zoo Director Dr. David Jones to spearhead a second nationwide effort to raise funds for the Baghdad Zoo in Iraq in 2003. More than $77,000 was raised towards the aid project.

The N.C. Zoo continued to help the Baghdad Zoo beyond this fundraising effort via several avenues. Through an innovative teleconferencing program that was established by the North Carolina State University College of Veterinary Medicine, vets at the Iraqi zoo have been able to receive advice and assistance from vet experts in North Carolina via a virtual link to classes. Baghdad vets were able to interact via satellite internet connection with instructors, students and N.C. Zoo staff veterinarians. Financial support and equipment that made this possible came from the N.C. Zoological Society and the U.S. Army.

Tracking Elephants in Uganda

How do you spy on an elephant? That is what researchers from the N.C. Zoo needed to figure out if they were going to help both elephants and people living in Cameroon. The zoo began working with the World Wildlife Fund's Program Office in Cameroon in 1998. Their goal was to protect elephants, protect the local people from elephants, and provide training to the people in Cameroon on the economic and ecological benefits of protecting elephants.

Humans and elephants in Cameroon were at odds, oddly enough, due to their similarities. Both elephants and humans require a large amount of space and a large amount of natural resources. A single adult elephant can consume 330 pounds of vegetation and 60 gallons of water in a day. In just a few hours, a herd can easily demolish a family's or an entire village's annual food supply. The zoo's researchers knew that property rights needed to be their focus, so they needed detailed information on where the elephants were traveling.

World Wildlife Fund team members install a tracking collar on a tranquilized elephant. N.C. Zoo photo.

The National Oceanic & Atmospheric Administration's weather satellites passed regularly over Cameroon. Dr. Mike Loomis, the zoo's chief veterinarian, and his team fitted elephants with radio collars that would allow them to be tracked by these satellites. This method gave the researchers the information they needed on where the elephants were going and when. They then needed to figure out how to use this information to protect people's crops while making sure the elephants got the resources they needed.

The research team approached this problem from three angles. First, they provided education to the people who had suffered from the elephants moving onto their land. They taught techniques for protecting crops from herds and about the economic and moral arguments for saving elephants. Second, the government of Cameroon provided financial support to those who had been harmed by the elephant herd. Finally, elephant herd location data was shared with rangers to alert them of elephants headed their way. The rangers could divert the elephants before any crops, or any elephants, were harmed. These strategies resulted in a drop in the number of clashes between people and elephants, and the model is now being used in several locations.

Recruited for Flounder

In 2001, Joanne Harcke, conservation and research coordinator for the N.C. Aquarium on Roanoke Island, was recruited to help Chinese scientists raise Southern flounder. Harcke visited four different research facilities and presented a seminar on larval development and culture techniques. Harcke was one of only a few people who were involved in Southern flounder larviculture at the time, and she was happy to share her expertise in Beijing.

Joanne Harcke at the Great Wall of China. Photo courtesy of Dr. Cris Liu.

Where in the World is Brian Rosa?

When the Division of Pollution Prevention and Environmental Assistance's Brian Rosa was contacted in 2005 and asked to teach composting and organic growing practices to farmers in Azerbaijan, he had one thought – where the heck is Azerbaijan?

Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance (ACDI/VOCA), who extended the invitation, is a private, nonprofit organization that promotes broad-based economic growth in emerging democracies and developing countries. Although Rosa had never heard of Azerbaijan (which he later learned was bordered by the Caspian Sea, south of Russia) he was excited to have the opportunity to spread the composting gospel to the some of the country's farmers and agricultural specialists.

Rosa volunteered to spend two weeks traveling throughout the country. He traveled to a small village where he conducted a workshop. The eight-hour workshop took a little longer than usual since each word Brian spoke had to be relayed through an interpreter, but everyone was patient and grateful. He continued his instruction by helping construct several compost piles throughout the village to get the community started with organic farming.

Rosa enjoyed his time in Azerbaijan and has been invited back to help start a large-scale vermicomposting (worm composting) operation. He hopes to return to the country soon to continue encouraging organic farming and natural practices.

As the wedding's guest of honor, Brian Rosa was invited to dance by himself for about five minutes, after which the village officials joined in for another half hour of dancing. Photo courtesy of Brian Rosa.

Ranger Tim Benton at Lake James State Park discusses park management with Korean dignitaries, Dr. Ju-Hee Lee and Gil Bon Koo. Office of Environmental Education.

An Invitation to South Korea

In October 2006, Libby Wilcox of the Office of Environmental Education was invited to travel to South Korea. The invitation came from Dr. Ju-Hee Lee, a professor at Daegu University in the North Gyeongsang province of South Korea. Dr. Lee worked closely with the Korea National Forest Service which was in the process of developing a certification program for its forest culture and recreation programs and its forest interpreters. Wilcox was invited to share information about the N.C. Environmental Education Certification Program, the first program of its kind in the United States, as well as information about the diverse environmental education resources and opportunities available in North Carolina.

Dr. Lee and members of the Korea Forest Service were so impressed with what they heard that they had to come check it out for themselves! The Office of Environmental Education coordinated their visit and Wilcox went from visitor to host, guide, driver and facilitator. Their stops included Grandfather Mountain, the Blue Ridge Parkway, Lake James State Park, the N.C. Arboretum, Great Smoky Mountains National Park, Great Smoky Mountains Institute at Tremont, Joyce Kilmer Memorial Forest, the Cradle of Forestry in America, Holmes Educational State Forest, Brevard College, Pisgah Forest Institute and the forest lands at the Biltmore Estate. The delegation also met with officials from the U.S. Forest Service, the Appalachian Trail Conservancy and the Division of Forest Resources. On their final day, the group traveled to the N.C. Department of Environment and Natural Resources' headquarters in downtown Raleigh to meet with Secretary Bill Ross. The group then visited with the entire staff of the Office of Environmental Education for a moment of rest and a final goodbye before heading back to South Korea.

Alternative Thinking

North Carolina, along with the rest of the world, is facing many environmental challenges. Overcoming these challenges will require innovative, outside-of-the-box thinking. Staff in the Department of Environment and Natural Resources are stepping up to the challenge.

Artist's rendering of the Fort Macon Visitor and Coastal Education Center. Groundbreaking for this project was in early 2008.

Green Building Commitment

In 2007, the Division of Parks and Recreation continued its ongoing efforts to promote sustainable building practices by adopting a policy requiring the pursuit of Leadership in Energy and Environmental Design (LEED) certification for all new or significantly renovated buildings more than 5,000 square feet in size. The LEED Green Building Rating System and certification program is administered by the U.S. Green Building Council. LEED emphasizes state-of-the-art sustainability strategies for site design, waste reduction, water efficiency, renewable energy and more.

Going Solar

Do you know who hosts North Carolina's largest solar power project? It's the N.C. Zoo! In 2008, through a partnership with Carolina Solar Energy and Randolph Electric Membership, the zoo had a 9,600 square foot, grid-tied photovoltaic solar system mounted on three picnic pavilions. The project was projected to create 130,000 kilowatt-hours of energy per year, enough to power 11 to 13 average homes in North Carolina.

One of the zoo's solar picnic pavilions. N.C. Zoo photo.

A Bright Idea

If every household in North Carolina replaced just one incandescent light bulb with a compact fluorescent (CFL) bulb, it would conserve enough energy to light more than 86,000 homes for an entire year! That was one of the messages that the Division of Air Quality was sharing beginning in 2007 with its Change A Light campaign. The division partnered with the State Energy Office, N.C. Cooperative Extension and a number of electric utilities to inform the public about the energy they could conserve, the money they could save and the pollution they could reduce simply by changing to CFL bulbs.

A key effort during the campaign was to distribute free CFLs to people who pledged to use them in their homes. Progress Energy donated 10,000 bulbs to be distributed at the N.C. State Fair in Raleigh. Other utilities donated thousands more bulbs that were distributed at county fairs and energy workshops across the state. The campaign also reached teachers and students by making a teacher guide available online that included classroom activities. Finally, state employees received information with their September 2007 paycheck about the benefits of CFLs and an invitation to participate in the campaign. The CFL promotion was continued at the Green N.C. exhibit at the 2008 State Fair, with Progress Energy providing 11,000 bulbs to distribute to citizens for free.

Energy From Waste

The Division of Waste Management is the state partner with the U. S. Environmental Protection Agency's Landfill Methane Outreach Program, working to facilitate a number of landfill gas projects with uses such as electricity generation, steam production, greenhouses, artist studios and the production of biodiesel. As the state ally in this program, the Division of Waste Management works with landfill owners, developers and end-users to make these projects happen.

The Division of Pollution Prevention and Environmental Assistance, along with DWM, the State Energy Office and the Solar Center, developed a major state conference on developing energy production from landfill gas resources. DWM has worked in conjunction with The Energy Center at Appalachian State University and the Golden Leaf Foundation to spread the word about the economic and environmental benefits of landfill gas utilization. Companies such as Ajinimoto, Mallinckrodt, Cone Mills and Google benefit from DENR's efforts in this area.

Landfill methane gas flare. Photo by Susie Fields.

Nursery pigs move to the grower barn. N.C. Division of Pollution Prevention and Environmental Assistance.

Energy Hogs

With the signing of Senate Bill 1465 in 2007, the General Assembly created the Swine Farm Methane Capture Pilot Program. Through this program, up to 50 swine farms will work with the N.C. Division of Soil and Water Conservation and the N.C. Utilities Commission to capture methane gas generated by their waste systems and use it to generate electricity. Turning pig waste into electricity…now that's alternative thinking!

A flush pipe runs from the swine barn into the lagoon. N.C. Division of Pollution Prevention and Environmental Assistance.

No Boundaries

Although the Department of Environment and Natural Resources is charged with preserving and protecting the natural resources in North Carolina, partnerships are often forged outside the borders of the state. Natural resources such as rivers and ecosystems do not recognize state boundaries, and the department can often accomplish more when it doesn't recognize them, either.

Crossing the Line

The Albemarle-Pamlico estuary system is the second largest estuary system in the United States. Estuaries serve as nurseries for marine organisms, act as pollutant filters and help control flooding in coastal areas. The Albemarle-Pamlico sounds encompass 16 counties in Virginia and 36 counties in North Carolina. In 2001, DENR Secretary Bill Ross signed an agreement with Virginia's Secretary of Natural Resources and Department of Conservation and Recreation director, pledging to work together to protect the critical resource. The North Carolina and Virginia agencies promised to coordinate their research and conservation efforts in the three river basins that make up the Albemarle-Pamlico estuary system.

An UnSERPPASable Partnership

Rapid population growth and environmental resource loss are not only issues faced in North Carolina. The entire southeastern United States faces similar issues, and these challenges are also affecting military bases where land is needed to conduct training exercises. In response to these shared issues, in 2005 state environmental and natural resource officials across the Southeast partnered with the Department of Defense and other federal agencies to form the Southeast Regional Partnership for Planning and Sustainability, or SERPPAS. The agencies involved work together to prevent encroachment around military lands, encourage compatible resource-use decisions and improve coordination among regions states, communities and military services.

One endeavor that SERPPAS has been working towards is the recovery of red-cockaded woodpecker populations. Red-cockaded woodpeckers depend on longleaf pine forests in southeastern states. Many of these forests have been destroyed, but boundaries of military installations in the Southeast have helped protect the longleaf pine habitat from complete destruction. SERPPAS partners have been working together not only to protect longleaf habitat, but also to reintroduce red-cockaded woodpeckers into restored habitats in order to increase the overall population of the endangered bird.

Longleaf pine forest. Photo by: Misty Franklin

Red-cockaded Woodpecke, NC Wildlife Commission

Disaster Response

In disaster situations, other states often call on the N.C. Division of Forest Resources for assistance. The division provides trained personnel and equipment for dispatch to virtually any location in the United States. The recurring requests are a testament to the high level of training and fire control expertise that division personnel have obtained. North Carolina's Division of Forest Resources is recognized nationwide as one of the most efficient and best-trained fire-suppression agencies on which to call for assistance. In the past eight years, the division has sent fire fighting and other emergency assistance to Nevada, Texas, Oklahoma, Tennessee, Arkansas, Minnesota, Florida, Montana, Wyoming and Georgia.

The morning briefing of the N.C. Division of Forest Resources Incident Management Team while in Florida working on Hurricane Frances response.
N.C. Division of Forest Resources.

ee environmental education

N.C. Office of Environmental Education.

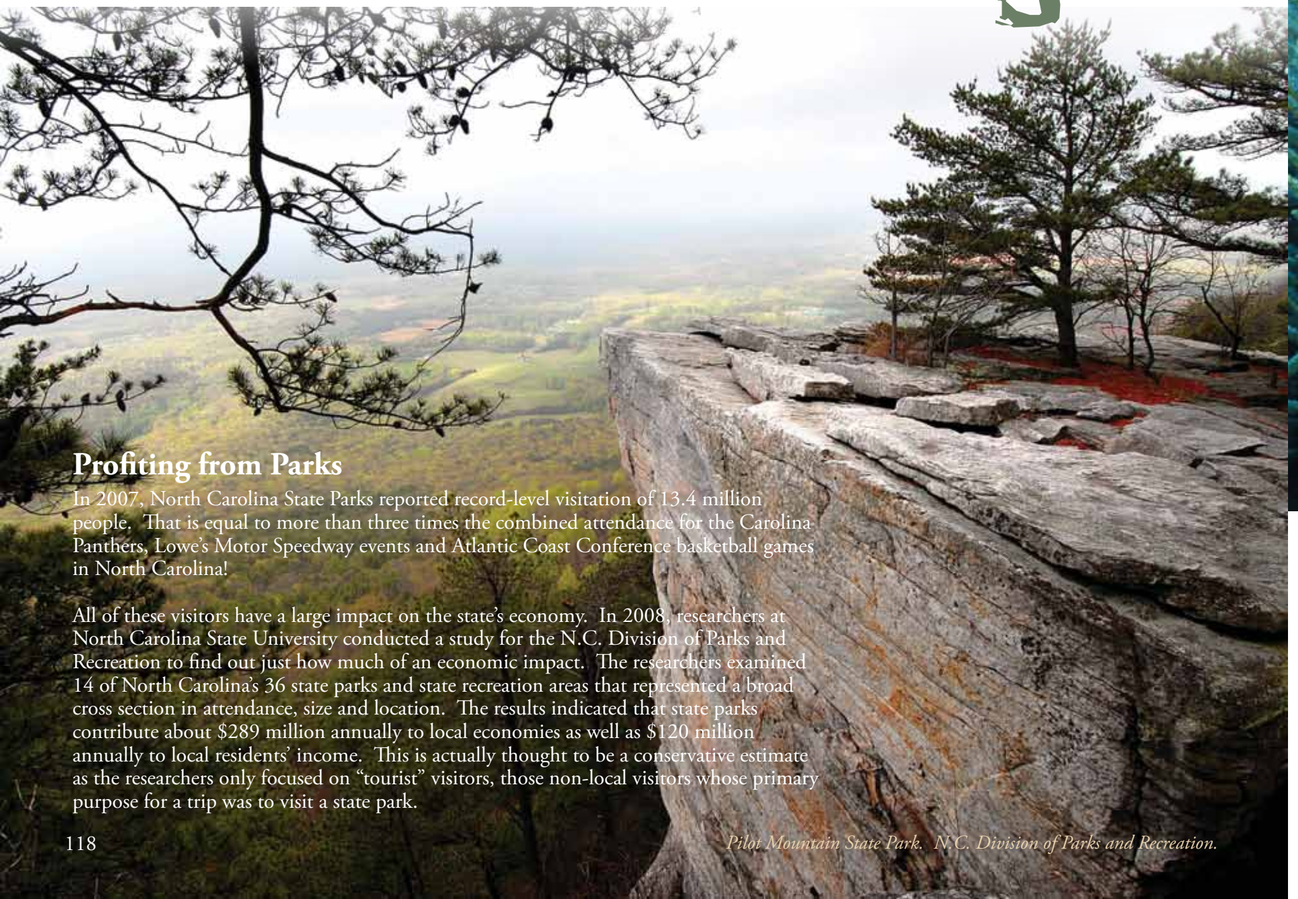
Environmental Education in the Southeast

When EEinGeorgia.org got a grant from the Environmental Protection Agency to share its newly developed Web site capabilities with other southeastern environmental organizations, the N.C. Office of Environmental Education was chosen as the pilot state. The office has worked closely with its counterpart in Georgia to build capacity for environmental education throughout the Southeast. Beginning in 2005, the two states worked together to develop Web-based resources that would help their citizens find environmental resources, events and centers.

"The new Web site features make it possible for the Office of Environmental Education to provide information about environmental education events, programs, and facilities to people all over North Carolina," said Lisa Tolley, director of the office. "It really highlights the diversity of environmental education programs going on in our state."

Teachers can now find environmental education professional development opportunities on the online calendar.
N.C. Museum of Natural Sciences

Show Me the Money



Profiting from Parks

In 2007, North Carolina State Parks reported record-level visitation of 13.4 million people. That is equal to more than three times the combined attendance for the Carolina Panthers, Lowe's Motor Speedway events and Atlantic Coast Conference basketball games in North Carolina!

All of these visitors have a large impact on the state's economy. In 2008, researchers at North Carolina State University conducted a study for the N.C. Division of Parks and Recreation to find out just how much of an economic impact. The researchers examined 14 of North Carolina's 36 state parks and state recreation areas that represented a broad cross section in attendance, size and location. The results indicated that state parks contribute about $289 million annually to local economies as well as $120 million annually to local residents' income. This is actually thought to be a conservative estimate as the researchers only focused on "tourist" visitors, those non-local visitors whose primary purpose for a trip was to visit a state park.

Pilot Mountain State Park. N.C. Division of Parks and Recreation.

Green doesn't just symbolize the environment; it stands for money as well. Often natural resources are not thought of in economic terms, but they are critical to North Carolina's economic health. Green spaces enhance the value of neighborhoods, natural resources provide ecosystem services such as water filtration and environmental organizations and programs generate income and jobs within communities.

North Carolina Christmas tree farm. Bill Russ, N.C. Tourism.

Money Does Grow On Trees

- Forest products are North Carolina's largest industry, surpassing textiles in 2007.
- In 2006, forest products manufacturing employed one out of every five of the state's manufacturing workers
- North Carolina is the second leading manufacturer of furniture in the United States
- North Carolina produces more than 19 percent of the real Christmas trees in the United States
- Forestry, logging and wood products manufacturing contribute 10.9 billion dollars annually to the state's economy.

Are You Going to Recycle That?

Recycling is not only beneficial to the environment; it's also beneficial to the economy of North Carolina. That is according to 2004 and 2008 studies released by the N.C. Recycling Business Assistance Center, a program of the N.C. Division of Pollution Prevention and Environmental Assistance. While the number of manufacturing jobs has been declining, recycling jobs have increased. From 1994 to 2004, for example, the number of recycling jobs in North Carolina increased 60 percent. Employees in the recycling industry have a total annual payroll of $379 million, which provides more than $13 million in tax revenue.

While manufacturing jobs have been declining in the state, producers of recycled products are ensuring that manufacturing remains a part of North Carolina's economic future. Products manufactured out of recycled materials range from paper, plastic bottles and flowerpots to composite decking and rubber mulch.

A 4.4 percent increase in recycling rates would have the same effect as removing 27 million passenger cars from the roadway each year. Saving landfill space, creating jobs, reducing pollution…isn't recycling great?!

Aluminum cans ready for recycling at the Onslow County Recycling Center. Photo by Susie Fields.

Awarding Assets

The N.C. Aquariums and the North Carolina Aquarium Society were winners of the 2002 G. Lynn Nisbet Award. The Travel Council of North Carolina presents the annual award to an organization or business that makes significant contributions to the state's travel and tourism industry.

Young visitors eye an alligator at the N.C. Aquarium at Fort Fisher. N.C. Aquariums.

What's Brown, Then Green and Making a Difference All Over?

There are stores, museums, libraries, sports fields and restaurants across North Carolina that people visit everyday that are located on former brownfields. So, what is a brownfield, anyway? It's an opportunity – for economic development, job creation and environmental restoration all at the same time.

A "brownfields site" is an abandoned, idle or underused property where redevelopment has been hindered by the threat of environmental contamination. The North Carolina Brownfields Program, which is administered by the Division of Waste Management, is the state's effort to overcome these barriers to site redevelopment. The Brownfields Property Reuse Act of 1997 set forth the authority for the Department of Environment and Natural Resources to work with prospective developers to put these brownfields sites back into use. The prospective developer, as defined under the statute, is any person who desires to buy or sell a brownfields property for the purpose of redeveloping it and who did not cause or contribute to the contamination of the property.

At the heart of the program is the brownfields agreement – in effect a covenant not-to-sue offered to a prospective developer of a brownfields property. This agreement is designed to break environmental liability barriers that hinder a developer's ability to obtain project financing. Under a brownfields agreement, a prospective developer agrees to perform those actions deemed by the department to be essential to protect public health and the environment while making the property suitable for the proposed reuse.

North Carolina local governments were awarded $2.7 million in U.S. EPA brownfields grants in 2008, more than in any previous year. This figure was the highest among southeastern states and eighth highest awarded nationwide.

Statewide, there have been 131 brownfields agreements (24 of them in Fiscal Year 2008) that have facilitated the reuse of abandoned, contaminated properties. In effect, it's recycling. This land has safely been recycled into productive use. The program has facilitated more than $4 billion in committed private investment in redevelopment, creating thousands of jobs in the process.

The restored brick chimney and oil house are also located in the lobby of the new Rocky Mount Arts Center. N.C. Division of Waste Management.

The Oyster Is Your World

Oysters hardly seem the likely poster child for the environment, but oysters serve many important functions in their estuarine environment. They filter pollutants out of the water, have economic value in the seafood trade and their shells are the perfect substrate on which new oysters grow. Many divisions within the Department of Environment and Natural Resources are working to track, study and ensure the health of oyster populations and habitat.

Recycling Shells

Craig Hardy, chief of Resource Enhancement for the N.C. Division of Marine Fisheries, was at a conference in South Carolina in 2002 when he saw a trailer bearing the state's oyster shell recycling logo pull up to the event's oyster roast. He was intrigued to say the least. "I was thinking that if it worked in South Carolina, it would be worth a try in North Carolina," said Hardy.

Hardy was right. North Carolina's Oyster Shell Recycling Program has collected more than 62,000 bushels of oyster shells to use for restoration projects. There are 71 public drop-off sites and 44 participating restaurants in 21 counties. Recycling oyster shells benefits commercial and recreational fishermen, improves water quality and protects shorelines from erosion…and helps grow more oysters to start the whole cycle again!

John Alexander with the N.C. Division of Marine Fisheries' Resource Enhancement Section unloads recycled oyster shells at a stockpile site. N.C. Division of Marine Fisheries.

Wherever the Spat Shall Land

Several agencies within the Department of Environment and Natural Resources have been working together to restore oyster habitat along the coast. In 2002, under the hot summer sun, staff and volunteers with the N.C. Coastal Federation, Duke Marine Lab and the N.C. Division of Marine Fisheries spread more than 5,000 pounds of oyster shells along the shoreline of the N.C. Aquarium at Pine Knoll Shores and at an oyster reef sanctuary nearby. Oyster populations and habitats had been declining in the state's coastal waters, and this project was part of an effort to reverse that trend. Oysters cannot grow just anywhere. Oyster larva, called spat, need a solid surface on which to attach. The most suitable surface for attachment happens to be oyster shells.

Additional help for oysters came in 2005 when the Oyster Hatchery Program was established by legislative initiative in response to declining harvests. The OHP was spearheaded by the N.C. Aquariums. Through the program, millions of baby oysters hatched at Carteret Community College were delivered to oyster sanctuaries. Previously, restoration efforts in North Carolina relied on importing oyster seed from other states. In 2007, the DMF designated four oyster research sanctuaries. Three were set apart for Carteret Community College in Morehead City to develop and use as demonstration areas. The fourth was set apart for the N.C. Aquarium at Pine Knoll Shores to use as a shellfish gardening education site.

An empty oyster shell is a great place for young oysters to attach. Newly attached oysters are called spat. People who live along estuaries can "plant" these shells with spat in a backyard oyster garden. Photo by Skip Kemp.

Plant Some Oysters in Your Garden

The Citizen's Oyster Gardening Project, based at Carteret Community College in Morehead City, was funded by the Albemarle Pamlico National Estuary Program in 2005. It provided workshops and training towards creating an active citizens' network of oyster gardeners in North Carolina. The CCC oyster hatchery distributed oyster larva to partners who planted public oyster gardens along the coast.

Aquarium Conservation and Research Coordinator Pat McNeese measures oysters for growth. N.C. Aquariums.